AMSAT SATELLITE REPORT

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Dayton Hamvention Sets New Marks

The largest gathering of amateurs in the world maintained its lead again this year by breaking all prior records for attendance at a convention. Nearly 30,000 basked in the pleasant Ohio sunlight this year in marked contrast to the blustery chill characterizing recent occasions.

The high point of the weekend for OSCAR folks began at noon on Saturday when the AMSAT Forum got under way with KO5I leading the way. Doug introduced speakers W3IWI, W3GEY and WA2LQQ to the capacity crowd estimated at nearly 200. Opening remarks by KO5I set the stage for a dramatic slide presentation by W3GEY showing how the Phase IIIB fuel tank came to be. Afterwards a lively question and answer period found many in the audience anxious to serve up a query for the panel of experts to field. Among the questioners was K6DUE, Roy Neal of the NBC TV news network. Roy was to give the banquet speech later that evening. At the close of the forum the feeling shared by many was that another hour or two could have been filled given the number of questions that went unanswered for lack of time. Ninety minutes seemed to have passed very quickly for those in attendance.

The traffic at the AMSAT booth was tremendous with new and renewing members trundling past in droves. The Hams-In-Space T-Shirts were dispensed in their entirety to donors galore. Only a few sweatshirts remained on Sunday to be packed for return to HQ. The new decals proved to be a popular item and dozens of supporters were seen with the decals affixed to their hats, jackets and miscellaneous parts of their anatomies. A large crowd remained around the TV monitor which was showing the AMSAT video tape production. It proved as popular at Dayton as it has elsewhere. Hundreds of familiar faces appeared in front of the AMSAT booth to be greeted by booth staffers KE3D, N3AHZ, W8GQW, W8JLE, K9PVW, K8OCL, W3HV, W3GEY, WB2LCC, W3IWI, W3XO, WDØEEL, K9LF, W6SP, W1HDX, KO5I, KEØT and more (who should not feel slighted for lack of mention; we appreciate your help). The donations to AMSAT realized over the weekend exceeded $4500. Nearly 100 new *ASR* readers signed up. Dozens of calendars and hundreds of decals were distributed.

As usual, lots of new equipment made its debut at Dayton. Of interest to satellite users (amateur variety) were offerrings by Ten-Tec, Microwave Modules, Cushcraft, KLM, Advanced Receiver Research, Lunar,

Individuals chiefly responsible for current flock of RS birds (l-r) UA3CR, UA3?O, UA2CED, (un-licensed), UA3DV, UA3XBO.

and Spectrum West. The new Ten-Tec Model 2510 Mode B Satellite Station made its first appearance. It will go into full production after Phase IIIB is launched. The rig has a complete 70 cm transmitter producing 10 watts and covering 435 to 435.5 (435.0 to 437.0 MHz with optional oscillator board). It includes a 2 meter to 10 meter receive converter for the Mode B downlink so that you can use your existing hf receiver as a tunable i-f. Pegged at $489, this new rig may find a welcome later this year with Phase IIIB drawing many from the turn-key box acquisition crowd! Microwave Modules had their new 100 watt solid-state power amplifier on display at the Spectrum International booth. John Beanland and XYL Dorothy explained that the new version has a new, more massive heat sink. They're right; ugh; we sprained a muscle attempting to inspect the beast. MM will be coming out with a 1269 transmit converter shortly to be compatible with the L-transponder aboard Phase IIIB. Cushcraft has a new satellite antenna out which may offer an improvement over their veteran 435-20T twist which has been around for a decade or so. The new version sports a modern design including fully insulated elements and a spiffy T feed. No performance reports available yet but K1WHS indicates the preliminary tests showed excellent circularity of better than 1 dB. Watch for this new performer in *ORBIT* product reviews soon. The new collaboration of KLM/Mirage saw a large contingent representing both. K6MYC explained the new heavy duty Az-El tracking system KLM had developed for medium to large TVRO dishes. He suggested that it would be equally suitable for amateur satellite use. There may

even be a small dish in KLM's line soon to respond to the need for a suitable antenna for the L-transponder's 24 cm uplink. Advanced Receiver Research had a broad range of quality preamps on display including a few budget-priced GaAsFETs and others. The ARR line will soon include transverters *ASR* is told. Lunar products were visible at many distributor's booths with a brisk trade evident in these premium station building blocks. Spectrum West debuted some interesting Japanese imports including all-mode transverters for 23 cm and 13 cm alike. Jim Smith, KA7APJ, says he will make these units available for a product review by *ORBIT* Magazine in a few months. Many of the manufacturers present were anxiously awaiting details and updates on the status of Phase IIIB so that they could time their production and/or product development plans accordingly. It was evident to this reporter that interest in the commercial sector for fielding Phase III compatible equipment has never been higher. AMSAT continues to offer its good offices to any manufacturer who requires guidance regarding what types of equipment will be best suited to the expected user community in the Phase III era now dawning.

Besides the array of equipment and the endless crowds, a few distinguished and welcome faces did stand out. W6XN spent most of the weekend with the crew from AMSAT. John is President of Project OSCAR. W2FPY, KA9Q and W4RI were among many of the computer ilk present. W9JUV of the old *HR Report* was to be found in many a booth helping out as required. AMSAT regulars WØZZQ, WB8OTH, W9BZ, W9MNU, WB5MPU, WA6ERB, WBØIUT and dozens of others who whizzed past (and will remain nameless) all helped to make Dayton a huge success for AMSAT again this year. Even the sheik was there again. Those inveterate *ASR* readers (gluttons for punishment that you are) will recall from last year the photo in *ASR* #7 of the Grand Vizar of Southern Dayton, Aziz Ziat El Turque (pronounced El Tur-kee). Yes, he was there again, albeit in disguise. He changed his name. Some disguise. That's why they call him El Turque, we suppose. Now known as Prince Emir El Hashish, he was last seen chasing after his camel on the east side of the flea market. Seems his camel absorbed too many fleas or something.

All told the annual catastrophy which befalls Dayton seems to have been weathered yet another year. Those who have never been or have been only in the remote past (3 years ago) to Dayton for the Hamvention be forewarned. Nothing, however, can truly prepare you for the magnitude of this event in all its dimensionality. Above all, it's fun.

Corrections

In *ASR* Number 30 we typoed the callsign of N3CHZ. Sri Molly. Also, the L transponder has a 70 cm downlink; not a 20 cm one. In *ASR* Number 31, the correct telephone number of the ASE Bulletin board is 512-852-8194.

RS-7 Bulletin Board Announcement

Beginning Thursday, 29 April, the bulletin board feature on RS-7 carried a message for amateurs in connection with the annual May Day celebration. The message read as follows: "WSEM DE RS7 PSE TFC 2 MA[.-.-] W 12 MSK NA [..—.] 14282 KGC". The characters in brackets have no English equivalent. The translation provided by Dex Anderson, W4KM, is as follows: "CQ DE RS7 PSE (send your messages on) 2 MAY at 1200 Moscow local time on 14282 kHz." Dex believes that the messages refer to messages exchanged to celebrate the May Day; the most important in the Soviet calendar. There was no indication of a desire for participation outside of the USSR. Indeed, had that been the case, the message likely would have been loaded in the bulletin board in other languages as well. At press time there were no indications of any other spectaculars associated with the Sputniks.

Orbital Data

As space allows, *ASR* will continue to post orbital data for use in tracking programs. The new Project OSCAR Prediction Calendar contains orbital data in the form of EQX times and longitudes for each of the 6 RS birds and for AMSAT-OSCAR 8. *ASR* will supplement this data with correction factors if/when they are needed. However, past experience has shown that long-term predictions of RS orbits is possible since the orbits are quite regular and mostly immune to the effects of atmospheric heating to which UoSAT (at the other extreme) is subject. AMSAT-OSCAR 8 is in the middle ground and the Project OSCAR predictions may require some "tweaking" later in the year. UoSAT is not included in the calendar because of the difficulty in making long-term predictions regarding its position. For those *ASR* readers requiring Keplerian elements for their satellite tracking computer programs, we will update them in alternate issues subject to space allowances in individual issues. For those requiring inputs of only period, increment and EQX for their programs, *ASR* will likewise carry these data as space allows.

The following is a revised list of anomalistic periods and longitude increments for use in your programs. These values were valid from the last week in April.

Satellite	Period (Anom) in Minutes	Longitude Increment (Degrees)
AO-8	103.174677	25.795948
UO-9	95.085054	23.771269
RS-3	118.519769	29.756673
RS-4	119.395180	29.975689
RS-5	119.555726	30.015854
RS-6	118.717769	29.806226
RS-7	119.196398	29.925957
RS-8	119.764346	30.068039

The new Project OSCAR Orbital Prediction Calendars are available from: Project OSCAR, P.O. Box 1136, Los Altos, CA 94022. The price is $8.75 postpaid to USA, Canada and Mexico. Elsewhere the price is $11.00 (US) postpaid. Please send a mailing label with your order if possible.

ASR *Spotlight on: ZL1AOX*

Most OSCAR afficionados got that way because they were hams, but not ZL1AOX, Ian Ashley. He became a ham because of his interest in the amateur satellite effort.

The Auckland resident began listening to and recording amateur satellites with OSCAR 4, launched late in 1965, but didn't get his ham ticket until 1968. Ian's "Elmer" in his early ham years was ZL3QL, T.D. Carrell.

Later, in association with ZL1AHO, Ron Sykes, Ian got interested in computers and AMSAT membership.

The *AMSAT Newsletter* and group purchasing plan had the effect of steering him in the general direction of S-100-based equipment.

Then he and Ross Biggar, ZL1WN, began working together on AMSAT-related telemetry, which came to the attention of that Argus-eyed talent scout, Tom Clark, W3IWI.

Also, Ian's job has given him some all-too-rare opportunities to visit with some of the other members of AMSAT's "hard core." He is a pilot for Air New Zealand and has held that lofty position since 1964.

A delivery job to West Germany enabled him to spend a half-day with Karl Meinzer, in Marburg, last September.

In any event, ZL1AOX will be an important link in the chain of command stations for the Phase III satellite when it goes into orbit later (we hope) this year.

In their computer-related activities, Ian and Ross got some excellent help from a rather unanticipated source, Ross's son, Darryl, who at age 13 was conversant with IPS and other computer languages and their software. Now 15, Darryl has acquired further expertise and the call ZL1UFK.

The New Zealanders were reportedly the first of the command stations to get IPS working on the Phase III Integrated Housekeeping Unit, which accomplishment is a source of justifiable pride for them.

When Phase III goes up, ZL1AOX will be on deck with a station consisting of a Yaesu FT-221 for two meters, a Microwave Modules-FT-101 combination and Kenwood TR9500 for 70 cm.

Antennas will be a helical array and a K2RIW 19-element yagi for 432 and a 10-element crossed yagi job for 2 meters.

The output stage of the 70 cm uplink will be a 100-watt solid-state amplifier. Needless to say, everything will be computer-controlled.

Some of Ian's confreres point out that his command station is in an extremely critical spot, particularly during the first few orbits of Phase III.

The satellite's perigee will occur over the southern hemisphere, giving hams living there relatively short access time to the bird.

ZL1AOX fondles the keyboard at KL7GRF during a recent visit to the latter's California QTH.

But this means also that the distance from the southern hemisphere command stations to the satellite will be relatively short as compared to stations in the northern hemisphere.

The satellite will be equipped with high-gain directive antennas as well as monopoles of much less gain. If there are problems with the deployment of antennas, if, for instance, the gain antennas are aimed in the wrong direction, the chances of loading corrective software into the bird are far greater from stations located near perigee.

In any circumstance, moreover, it would be difficult to imagine a more capable, resourceful group than the crew at ZL1AOX.

Hams in general are said to be resourceful, but considering the ready availability of equipment in many parts of the world, many of us have not been called upon to prove it. The New Zealand contingent *has* been so called upon.

Ian says he has very good support out of the U.S., but "distance is sometimes a problem."

Distance can also precipitate problems caused by wear and tear in transportation. We learned from U.S. sources that the New Zealanders had gotten some diskettes containing crucial programming information in such condition they were completely unusable.

Yet Ian and Ross, by some legerdemain, were able to get the information off the defective diskettes in usable form and copied onto fresh ones.

Selective delays in the mail can also result in serial material being received in reversed or jumbled order, but, as noted above, the ZLs were and are still able to effectively cope.

The crew at ZL1AOX is another example of the truly world-wide scope of AMSAT, but moreso, an example of the uncommon amount of skill, technical knowhow and just plain dedication that continues to go into the satellite program.

Gets Arkansas On OSCAR

One of the rarest states on the satellites is Arkansas. Many are those who need Arkansas to complete the Satellite endorsement to the WAS award. So when W9KE, Tom Doyle, whittled the list of "needed states" down to one after working WH6AMX and AH6BP (the latter for good measure), he looked to Arkansas and wondered what could be done. Finally he convinced K5FXB to give the RS birds a try. It worked! Tom got his 50th recently. He says that he sent a 5 element 2 meter beam to K5FXB which helped him get on. Now that he's on, let's try to maintain his interest for all those others who need Arkansas. Congratulations to W9KE and K5FXB!

Additional Net Listings

AMSAT Net Manager W8GQW advises that the following list of AMSAT UK nets was recently received from Mr. P.A.K. Dunstall, Surrey, England. We QSP them here as a service to our British and Continental readers who may wish to participate and are unaware of their extent:

Net Name	Day	Time	Frequency
AMSAT UK 80m	Wed.	1900UTC	3780 kHz
AMSAT UK 80m	Sun.	1000UTC	3780 kHz
AMSAT UK 2m	Sun.	1930UTC	144.280 MHz ssb
AMSAT UK 70cm	Sun.	1800UTC	432.210 MHZ ssb

Tks Mssrs Dudley es Dunstall!

Vasil Terziev, LZ1AB, was recently accepted as AMSAT Area Coordinator for Bulgaria, the first such position assigned in the East European area. Vasil speaks English and has often provided valuable insight to the Russian Amateur Satellite activities.

A few lines from the new Project OSCAR Calendar to demonstrate the format are photo reduced here. The actual booklet size is 8½ x 11 inches and has 64 pages plus cover. Send for your copy soon. P.O. Box 1136, Los Altos, CA 94022. $8.75 postpaid U.S., Canada, Mexico. $11.00 elsewhere. Send mailing label with order please.

THU. 13 MAY 1982 (133)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
121'44	91	36'44	42	44'31	42	129' 3	53	34' 9	41	50'57	44	139'50	56
304'54	117	235'15	72	243'54	72	328'37	83	232'52	71	250' 9	74	339'36	86
448' 5	143	433'46	101	443'18	102	528'10	113	431'35	100	449'21	104	539'22	116
631'15	169	632'17	131	642'42	132	727'43	143	630'18	130	648'33	134	739' 8	146
814'26	195	830'49	161	842' 5	162	927'17	173	829' 1	160	847'44	164	938'54	176
957'36	220	1029'20	191	1041'29	192	1126'50	203	1027'44	190	1046'56	194	1138'39	206
1140'47	246	1227'51	220	1240'53	222	1326'24	233	1226'27	220	1246' 8	224	1338'25	236
1323'57	272	1426'22	250	1440'17	252	1525'57	263	1425'10	249	1445'20	254	1538'11	266
1507' 8	298	1624'52	280	1639'40	282	1725'30	293	1623'53	279	1644'32	284	1737'57	296
1650'18	324	1823'24	310	1839' 4	312	1925' 4	323	1822'36	309	1843'43	314	1937'43	326
1833'28	349	2021'55	339	2038'28	342	2124'37	353	2021'19	339	2042'55	344	2137'29	356
2016'39	15	2220'27	9	2237'51	12	2324'10	23	2220' 2	9	2242' 7	13	2337'15	26
2159'49	41												
2343' 0	67												

FRI. 14 MAY 1982 (134)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
126'10	93	18'58	39	37'15	42	123'44	53	18'45	38	41'19	43	137' 1	56
309'21	118	217'29	69	236'39	72	323'17	83	217'28	68	240'31	73	336'47	87
452'31	144	416' 0	98	436' 3	102	522'50	113	416'11	98	439'42	103	536'33	117
635'42	170	614'31	128	635'26	132	722'24	143	614'54	128	638'54	133	736'18	147
818'52	196	813' 2	158	834'50	162	921'57	173	813'37	158	838' 6	163	936' 4	177
1002' 3	221	1011'33	188	1034'14	192	1121'31	204	1012'20	188	1037'18	193	1135'50	207
1145'13	247	1210' 4	217	1233'37	222	1321' 4	234	1211' 3	217	1236'29	223	1335'36	237
1328'24	273	1408'36	247	1433' 1	252	1520'37	264	1409'46	247	1435'41	253	1535'22	267
1511'34	299	1607' 7	277	1632'25	282	1720'11	294	1608'29	277	1634'53	283	1735' 8	297
1654'44	325	1805'38	307	1831'49	312	1919'44	324	1807'13	307	1834' 5	313	1934'54	327
1837'55	350	2004' 9	336	2031'12	342	2119'17	354	2005'56	337	2033'17	343	2134'40	357
2021' 5	16	2202'40	6	2230'36	12	2318'51	24	2204'39	6	2232'28	13	2334'26	27
2204'16	42												
2347'26	68												

SAT. 15 MAY 1982 (135)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
130'37	94	11'11	36	30' 0	42	118'24	54	3'22	36	31'40	43	134'11	57
313'47	119	159'42	66	229'23	72	317'58	84	202' 5	66	230'52	72	333'57	87
456'58	145	358'14	95	428'47	102	517'31	114	400'48	96	430' 4	102	533'43	117
640' 8	171	556'45	125	628'11	132	717' 4	144	559'31	126	629'16	132	733'29	147
823'19	197	755'16	155	827'35	162	916'38	174	758'14	155	828'27	162	933'15	178
1006'29	223	953'47	185	1026'58	192	1116'11	204	956'57	185	1027'39	192	1133' 1	208
1149'39	248	1152'18	214	1226'22	222	1315'44	234	1155'40	215	1226'51	222	1332'47	238
1332'50	274	1350'49	244	1425'46	252	1515'18	264	1354'23	245	1426' 3	252	1532'33	268
1516' 0	300	1549'20	274	1625' 9	282	1714'51	294	1553' 6	275	1625'14	282	1732'19	298
1659'11	326	1747'51	304	1824'33	311	1914'24	324	1751'49	304	1824'26	312	1932' 5	328
1842'21	352	1946'23	333	2023'57	341	2113'58	354	1950'32	334	2023'38	342	2131'50	358
2025'32	17	2144'54	3	2223'20	11	2313'31	24	2149'15	4	2222'50	12	2331'36	28
2208'42	43	2343'25	33					2347'58	34				
2351'53	69												

SUN. 16 MAY 1982 (136)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
135' 3	95	141'56	63	22'44	41	113' 5	54	146'41	64	22' 2	42	131'22	58
318'14	121	340'27	93	222' 8	71	312'38	84	345'24	93	221'13	72	331' 8	88
501'24	146	538'58	122	421'32	101	512'11	114	544' 7	123	420'25	101	530'54	118
644'34	172	737'29	152	620'55	131	711'45	144	742'50	153	619'37	131	730'40	148
827'45	198	936' 1	182	820'19	161	911'18	174	941'33	183	818'49	161	930'26	178
1010'55	224	1134'32	212	1019'43	191	1110'51	204	1140'16	213	1018' 1	191	1130'12	208
1154' 6	250	1333' 3	241	1219' 6	221	1310'25	234	1339' 0	242	1217'12	221	1329'58	238
1337'16	275	1531'34	271	1418'30	251	1509'58	264	1537'43	272	1416'24	251	1529'43	269
1520'27	301	1730' 5	301	1617'54	281	1709'32	294	1736'26	302	1615'36	281	1729'29	299
1703'37	327	1928'36	331	1817'18	311	1909' 5	324	1935' 9	332	1814'48	311	1929'15	329
1846'48	353	2127' 7	0	2016'41	341	2108'38	354	2133'52	2	2013'59	341	2129' 1	359
2029'58	19	2325'39	30	2216' 5	11	2308'12	24	2332'35	31	2213'11	11	2328'47	29
2213' 8	44												
2356'19	70												

MON. 17 MAY 1982 (137)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
139'28	96	124'10	60	15'29	41	107'45	54	131'18	61	12'23	41	128'33	59
322'40	122	322'41	90	214'52	71	307'18	84	330' 1	91	211'35	71	328'19	89
505'50	148	521'17	119	414'16	101	506'52	114	528'44	121	410'47	101	526' 5	119
649' 1	173	719'43	149	613'40	131	706'25	144	727'27	151	609'58	131	727'51	149
832'11	199	918'14	179	813' 4	161	905'58	174	926'10	181	809'10	160	927'37	179
1015'22	225	1116'45	209	1012'27	191	1105'32	204	1124'53	210	1008'22	190	1127'22	209
1158'32	251	1315'16	238	1211'51	221	1305' 5	234	1323'36	240	1207'34	220	1327' 8	239
1341'43	276	1512'48	268	1411'15	251	1504'39	264	1522'19	270	1406'46	250	1526'54	269
1524'53	302	1712'19	298	1610'38	281	1704'12	294	1721' 2	300	1605'57	280	1726'40	299
1708' 3	328	1910'50	328	1810' 2	311	1903'45	324	1919'45	330	1805' 9	310	1926'26	330
1851'14	354	2109'21	357	2009'26	341	2103'19	354	2118'28	359	2004'21	340	2126'12	0
2034'24	20	2307'52	27	2208'50	11	2302'52	24	2317'11	29	2203'33	10	2225'58	30
2217'35	45												

TUE. 18 MAY 1982 (138)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
0'45	71	106'23	57	8'13	41	102'25	54	115'54	59	2'44	40	125'44	60
143'56	97	304'54	87	207'37	71	301'59	84	314'37	89	201'56	70	325'30	90
327' 6	123	503'26	116	407' 1	101	501'32	114	513'20	119	401' 8	100	525'15	120
510'17	149	701'57	146	606'24	131	701' 5	144	712' 3	148	600'20	130	725' 1	150
653'27	174	900'28	176	805'48	161	900'39	174	910'47	178	759'32	160	924'47	180
836'37	200	1058'59	206	1005'12	191	1100'12	204	1109'30	208	958'43	189	1124'33	210
1019'48	226	1257'30	235	1204'35	221	1259'46	234	1308'13	238	1157'55	219	1324'19	240
1202'58	252	1456' 1	265	1403'59	251	1459'19	264	1506'56	268	1357' 7	249	1524' 5	270
1346' 9	278	1654'32	295	1603'23	281	1658'52	294	1705'39	297	1556'19	279	1723'51	300
1529'19	303	1853' 3	325	1802'47	311	1858'26	324	1904'22	327	1755'31	309	1923'37	330
1712'30	329	2051'35	354	2002'10	341	2057'59	354	2103' 5	357	1954'42	339	2123'23	0
1855'40	355	2250' 6	24	2201'34	11	2257'32	24	2301'48	27	2153'54	9	2323' 9	30
2038'51	21									2353' 6	39		0
2222' 1	47												

WED. 19 MAY 1982 (139)

UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
5'11	72	48'37	54	0'58	41	57' 6	54	100'31	57	152'18	69	122'54	61
148'22	98	247' 8	84	200'21	71	256'39	84	259'14	86	351'29	99	322'40	91
331'32	124	445'39	113	359'45	100	456'13	114	457'57	116	550'41	129	522'26	121
514'43	150	644'10	143	559' 9	130	655'46	144	656'40	146	749'53	159	722'12	151
657'53	176	842'41	173	758'33	160	855'19	174	855'23	176	949' 5	189	921'58	181
841' 4	201	1041'13	203	957'56	190	1054'53	204	1054' 6	206	1148'17	219	1121'44	211
1024'14	227	1239'44	233	1157'20	220	1254'26	234	1252'49	235	1347'28	248	1321'30	241
1207'25	253	1438'15	262	1356'44	250	1453'59	264	1451'32	265	1546'40	278	1521'16	271
1350'35	279	1636'46	292	1556' 7	280	1653'32	295	1650'15	295	1745'52	308	1721' 2	301
1533'45	305	1835'17	322	1755'31	310	1853' 6	325	1848'58	325	1945' 4	338	1920'47	331
1716'56	330	2033'48	352	1954'55	340	2052'39	355	2047'41	355	2144'15	8	2120'33	1
1900' 6	356	2232'19	21	2154'19	10	2252'13	25	2246'24	25	2343'27	38	2320'19	31
2043'17	22			2353'42	40								
2226'27	48												

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UTC(AOB)	LNG	UTC(RS3)	LNG	UTC(RS4)	LNG	UTC(RS5)	LNG	UTC(RS6)	LNG	UTC(RS7)	LNG	UTC(RS8)	LNG
9'38	74	30'51	51	153' 6	70	51'46	55	45' 7	54	142'39	68	120' 5	61
152'48	99	229'22	81	352'30	100	251'20	85	243'50	84	341'51	98	319'51	91
336'59	125	427'55	111	551'53	130	450'53	115	442'34	114	541' 3	128	519'37	121
519' 9	151	626'24	140	751'17	160	650'26	145	641'17	144	740'14	158	719'23	152
702'19	177	824'55	170	950'41	190	850' 0	175	840' 0	174	939'26	188	919' 9	182
845'30	203	1023'26	200	1150' 5	220	1049'33	205	1038'43	203	1138'38	218	1118'55	212
1028'40	228	1221'57	230	1349'28	250	1249' 6	235	1237'26	233	1337'50	248	1318'41	242
1211'51	254	1420'28	259	1548'52	280	1448'40	265	1436' 9	263	1537' 2	277	1518'26	272
1355' 1	280	1619' 0	289	1748'16	310	1648'13	295	1634'52	293	1736'13	307	1716'12	302
1538'12	306	1817'31	319	1947'39	340	1847'46	325	1833'35	323	1935'25	337	1917'58	332
1721'22	332	2016' 2	349	2147' 2	10	2047'20	355	2032'18	352	2134'37	7	2117'44	2
1904'32	357	2214'33	18	2346'20	40	2246'53	25	2231' 1	22	2333'49	37	2317'30	32
2047'43	23												
2230'53	49												

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